W.B.S 2.9 Far Detector Assembly

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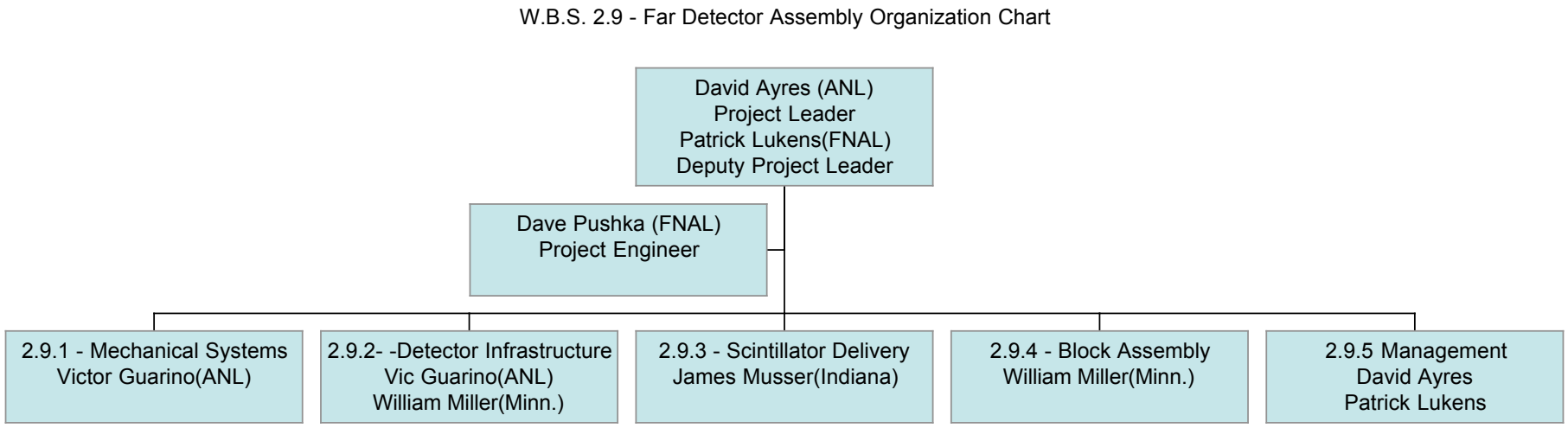
Fermilab

Overview

- Far Detector Assembly Subproject deliverables
  - Prepare the Ash River detector hall for assembly and operation of the Far Detector
    - Provide support systems - scintillator distribution, local electrical power distribution
  - Provide all tooling needed for detector assembly
  - Assemble the detector modules into blocks - final configuration
  - Support the “outfitting” of the detector
    - Filling modules with scintillator
    - Installation of readout electronics

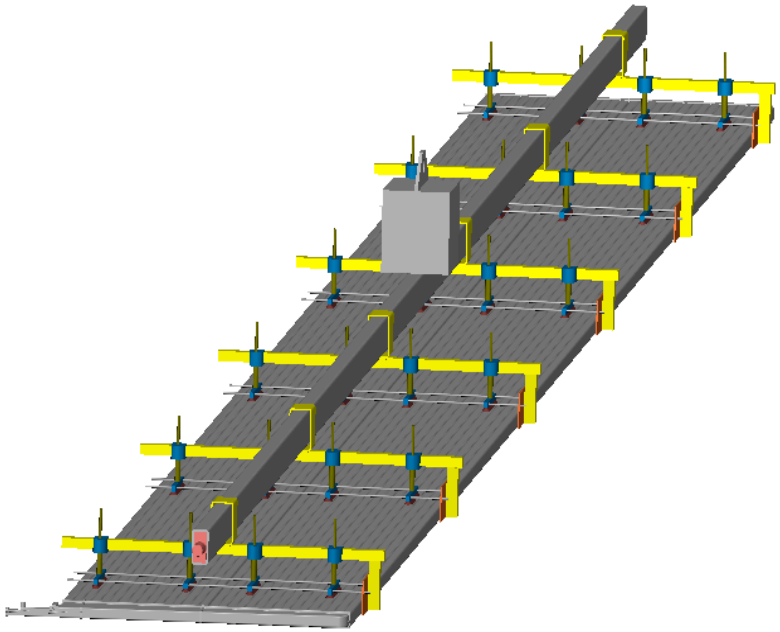
Organization



- Coordination takes place at weekly meetings (FNAL, conference phone)
- Value Engineering occurs in these meetings
  - Regular internal reviews are held to evaluate technical decisions

2.9.1 Mechanical Systems

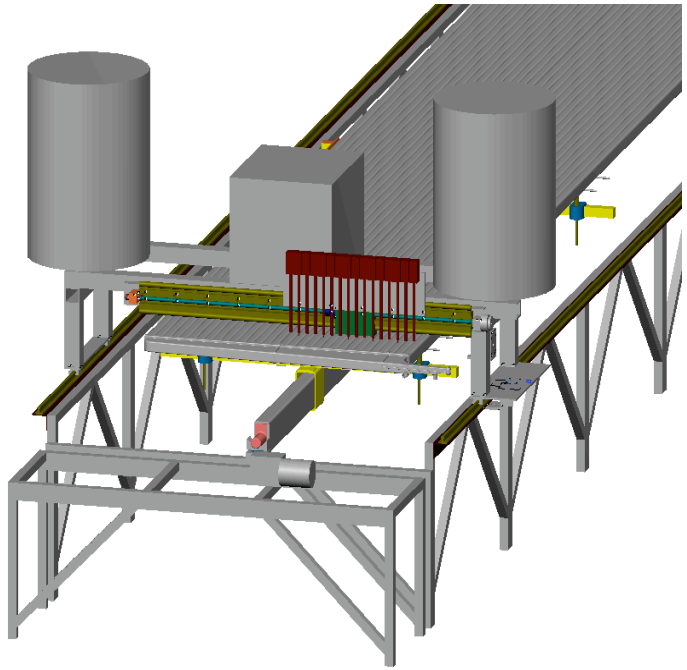
- This task consists of the tooling needed to assemble the detector
  - Lifting fixtures
  - Adhesive dispenser for gluing modules
  - Block pivoter table for handling full blocks
- Most activity for this task is based at ANL and FNAL.
- Most of our mechanical engineering needs are here.



Lifting Fixture for 32 channel module

2.9.1 Mechanical Systems

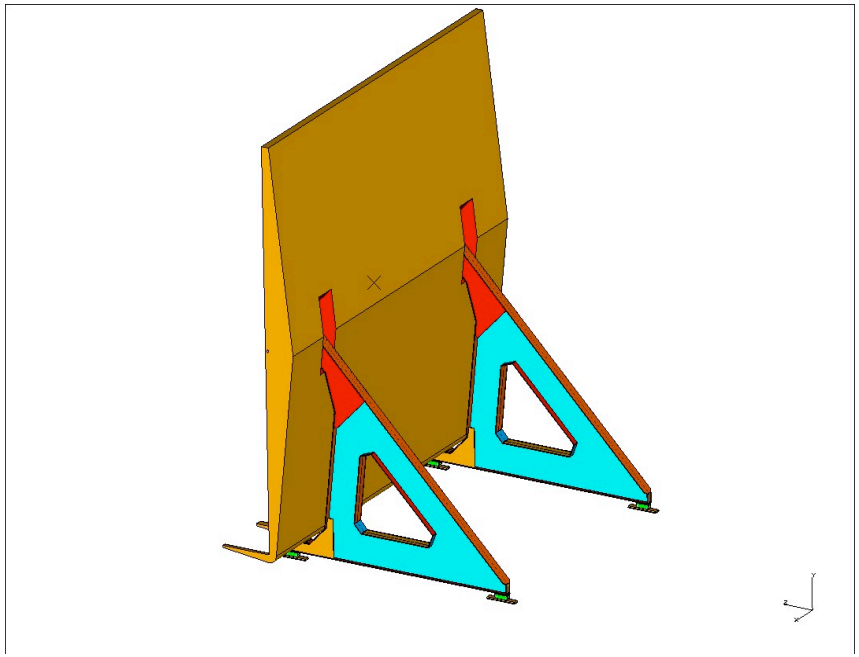
- Most mechanical systems tasks are planned to occur early in the project
- Designs, fabrications, and commissioning can occur at ANL/FNAL
  - Used on the assembly “dry runs” at ANL
- Operation should be well understood before the systems are needed.



Adhesive Dispenser concept

2.9.1 Mechanical Systems

- After commissioning to the extent possible, the tooling will be shipped to the Ash River site.
  - Some commissioning will be a challenge, due to space limitations.



Block Pivoter Table

2.9.2 Detector Infrastructure

- This task covers the miscellaneous items needed to support operation of the far detector.
  - Local electrical power distribution
  - Cosmic ray shield wall
  - Machine shop
  - Furnishing and power for the control room, office area
  - Safety equipment

2.9.3 Scintillator Filling Equipment

- The scintillator filling equipment is the responsibility of Indiana University.
  - Includes specification of the piping system
- The system is being designed to deliver well measured, temperature controlled scintillator to the modules after they are in place.
- Delivery equipment, conditioning equipment and control schemes will all be tested at I.U., well before they are needed at Ash River.

2.9.4 Block Assembly

- Block assembly consists mostly of the labor needed to assemble 38 blocks out of 14,136 modules.
  - Current constraints limit this activity to 130 calendar weeks.
- The beginning of this activity is determined by the building readiness.
- After that, this is the project critical path.
- At peak, we estimate 29 FTE effort in assembly, filling and outfitting.

Conclusions

- The Task of the Far Detector Assembly Subproject
  - Assemble 32 channel modules into the full 18 kton detector
  - Provide the liquid scintillator delivery system
  - Fill the modules with scintillator
  - Provide support for the electronics installation
  - Hand over a complete detector to operations

The Program

- Details of the subproject follow:
  - IPND and FD Prototypes – Karen Kephart (20 min.)
  - Mechanical Structure - Vic Guarino (30 min.)
  - 2.9.1 Mechanical Systems - Vic Guarino (20 min.)
  - 2.9.1.4 Block Pivoter - Dave Pushka (20 min.)
  - 2.9.2 Detector Infrastructure - Bill Miller (20 min.)
  - 2.9.3 Scintillator Filling Equipment - Jim Musser (30 min.)
  - 2.9.4 Block Assembly and Installation - Bill Miller (30 min.)